

PATENT ABSTRACTS OF JAPAN

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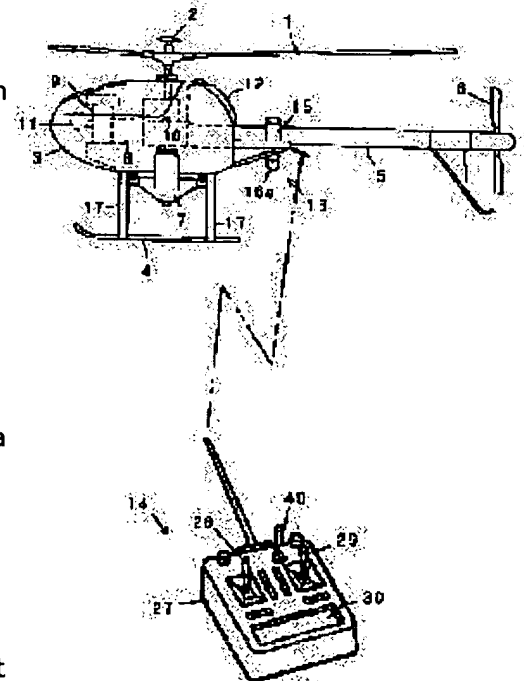
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(54) REMOTE CONTROL HELICOPTER

(57)Abstract:

PROBLEM TO BE SOLVED: To facilitate the proper flight of a helicopter and the proper scattering of a medicine by providing an engine revolution display device for displaying the number of revolutions of an engine on the outside of a machine body to accurately confirm the number of the revolutions of the engine from a control position far separated from the helicopter.

SOLUTION: When an engine starting switch is turned on at the beginning of work, a sel-motor is driven to drive an engine 9 without operators approach to the helicopter for its operation, and in addition, when the number of revolutions of the engine 9 is kept at the proper number of revolutions during a flight process, a pilot lamp 16a is continuously turned on to notify a remote pilot of proper revolutions. On the other hand, in the case where the revolutions are less than set number of revolutions, the T1 hour lighting one time and T2 hour light-out one time are repeated, and in the case where the revolutions are more than set number of revolutions, T one hour lighting twice and T two hours light-out one time are repeated to notify the abnormality of the number of revolutions to the remote pilot on the ground at a glance. Thus the proper flight of the helicopter and the proper scattering of medicine becomes possible.



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CLAIMS

[Claim(s)]

[Claim 1]A remote-control helicopter making the body outside equip with an engine rotation display which displays an engine speed value in a remote-control helicopter used for an aerial application of drugs, etc.

[Claim 2]The remote-control helicopter according to claim 1 having formed an engine rotation display with a pilot lamp, and providing so that a pilot lamp may be blinked at the time besides regulation of an engine speed value.

[Claim 3]A remote-control helicopter providing so that a pattern of blink may be changed by the above and the following from a specified speed.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the remote-control helicopter of an uninhabited type used for sprinkling drugs from the air to a field.

[0002]

[Problem(s) to be Solved by the Invention]In this seed remote-control helicopter, since an air performance is influenced by the engine speed value, it becomes important [carrying out proper control of the engine speed value], but. When an engine speed value is displayed on the monitor display machine with which the body is made to equip, it is hard to see, therefore there is troublesomeness of time and effort in measuring rotation of a rotor at the number of rotations at hand each time.

[0003]

[Means for Solving the Problem]Therefore, in a remote-control helicopter which uses this invention for an aerial application of drugs, etc., The body outside is made to equip with an engine rotation display which displays an engine speed value, an engine speed value is correctly checked also from an operation position which is distantly distant from a helicopter, and a proper flight of a helicopter and proper spraying of drugs are enabled.

[0004]An engine rotation display is formed with a pilot lamp, and a pilot lamp is blinked at the time besides regulation of an engine speed value, and an engine rotation situation of a helicopter under flight is correctly told to a manipulator at a glance.

[0005]A pattern of blink is changed by the above and the following and a manipulator is made to distinguish certainly beyond regulation of an engine speed value of a helicopter under flight, and the following from a specified speed.

[0006]

[Embodiment of the Invention]Hereafter, the example of this invention is explained in full detail based on a drawing. Drawing 1 is an operation explanatory view of a helicopter, drawing 2 is a transverse-plane explanatory view of a helicopter, a main rotor (1) and a stabilizer (2) are provided in the helicopter body (3) upper part, and a leg object (4) is made to fix to the body (3) bottom. A tail rotor (6) is provided in the tail-boom (5) back end on the body (3) backside, and it constitutes so that a dusting powder agent tank (7) may be made to fix to the body (3) bottom, a nolo flight may be carried out by remote control and the aerial application of ** manure or the drugs may be carried out.

[0007]Attach an engine (9) and a mission case (10) to the inside of said body (3) via a mainframe (8), and make a muffler (11) and a fuel tank (12) allocate, and. An engine (9) is started by a starter (13) and (refer to drawing 5), and said main rotor (1) and a tail rotor (6) are driven with an engine (9), and it constitutes so that a manipulator may do hand operation and may fly the transmitter for radio control (14). In drawing 2, it is a monitor display device which constitutes numerals (15) from a receiver for helicopter control, and constitutes (16) from a pilot lamp (16a).

[0008]The connecting part of the support made from a flat spring (17) and (17) which attach said leg object (4), and a mainframe (8) is made to carry out bolt stop immobilization of the carrier frame (18) and (19), as shown in drawing 3. Make a prevention-of-the-breeding-and-extermination frame (20) fix to a front carrier frame (18), and the prevention-of-the-breeding-and-extermination pump (21) and (21) is attached to the prevention-of-the-breeding-and-extermination frame (20) undersurface side, and the conspergents tank (7) order part of a spray machine is made to connect with the order carrier frame (18) and (19). The cap (22) and (22) which can be opened and closed freely is formed symmetrically with the right-and-left entrance slot of a conspergents tank (7).

[0009]A square cartridge base frame (23) is made to fix to said front carrier frame (18), Make an arm board (24) connect with a base frame (23) via a rocking lever shaft, enabling free rotation, and attach an arm board (24) via a long hole and a set screw, enabling a free angle change, and. The round pipe form atomizer arm (25) end face was made to fix to an arm board (24), and the atomizer (26) of the spray machine which sprinkles liquids and solutions is attached at the tip of said atomizer arm (25) via the check bolt, enabling a free angle change.

[0010]Provide a right-and-left stick (28), (29), a liquid crystal display (30), etc. in the square box type case (27) of said transmitter (14), and. Ene KOMBORYUMU (31) to which the advanced operation (vertical rise and fall) signal which performs set pitch control of a main rotor (1) to an engine (9) output list based on the lengthwise direction control input of the right stick (29) is made to output as shown in drawing 4, The aileron volume (32) to which the longitudinal-direction flight signal which performs horizontal cycle pitch control of a main rotor (1) based on the transverse direction control input of the right stick (29) is made to output, The elevator volume (33) to which the cross-direction flight signal which performs vertical cycle pitch control of a main rotor (1) based on the lengthwise direction control input of the left stick (28) is made to output, It has the rudder volume (34) to which the body direction operation signal which performs pitch control of a tail rotor (6) based on the transverse direction control input of the left stick (28) is made to output, Said display (30) and each volume (31) – (34) are connected

to the transmitting controller (35) of the transmitter (14) formed with a microcomputer, It constitutes so that said each volume (31) – (34) output may be transmitted to the receiving controller (36) of a helicopter (A). In drawing 4, a power battery and (38) (37) A main switch, (39) a voltage meter and (40) the antenna for transmission, (41), (42), (43), (44), and (45) A mode changeover switch, The engine start switch with which (46) drives said starter (13), The drugs feeding switch with which the multistory disk rotary switch with which (47) drives the multistory disk of said atomizer (26), and (48) drive said prevention-of-the-breeding-and-extermination pump (21), and (49) are sternway-before uniform velocity change-over switches which move forward or fly [sternway] the body with the optimal constant speed for spraying.

[0011]A helicopter (A) is equipped with the gyroscope for ailerons (50), the gyroscope for elevators (51), and the gyroscope for rudders (52) which are formed with 3 axis gyroscope and which are the sensors for flight stabilizing appliances as shown in drawing 5, Said each gyroscope (50) Make a receiving controller (36) make input connection of – (52), and. The servo motor for ene contests (53) which performs set pitch control of a main rotor (1) to an engine (9) output list, and carries out the vertical rise and fall of the helicopter (A), The servo motor for ailerons (54) which performs horizontal cycle pitch control of a main rotor (1), and flies a helicopter (A) to a longitudinal direction, The servo motor for elevators (55) which performs vertical cycle pitch control of a main rotor (1), and flies a helicopter (A) to a cross direction, The servo motor for rudders (56) which performs pitch control of a tail rotor (6) and makes the direction of a helicopter (A) change, It is what carries out output connection of said receiving controller (36) to the motor for multistory disks (58) which sprinkles drugs, and a prevention-of-the-breeding-and-extermination pump (21) and a pilot lamp (16a), [the servo motor for pitches (57), and] [a starter (13), and] The remote-control signal from said transmitting controller (35), And by each gyroscope (50) – (52) input, each servo motor (53) – (57) is operated, and it constitutes so that remote control of the helicopter (A) may be carried out based on the control signal of a transmitter (14).

[0012]In drawing 5, a power battery and (60) (59) A main switch, They are an engine rotation sensor with which (61) detects a receiving antenna and (62) detects rotation of said engine (9), and a GPS receiver which (63) inputs the signal of GPS (Global Positioning System), and detects the current position of a helicopter (A).

[0013]And as shown in drawing 6, when carrying out ON operation of the engine start switch (46) at the time of working starting, it is what a starter (13) drives, and an engine (9) drives without a worker approaching and operating it in a helicopter (A). When engine (9) number of rotations maintains proper number of rotations during a flight, While carrying out the continuous light of said pilot lamp (16a) and telling a remote manipulator proper rotation, 1 time is repeated [lighting of T 1 hour (for example, for 0.5 second)] for putting out lights of 1 time, and T 2 hours (for example, for 2 seconds) at the time of below setting-out rotation, and 1 time is repeated [lighting of T 1 hour] for putting out lights of 2 times, and T 2 hours at the time beyond setting-out rotation, and it tells the terrestrial manipulator who left the abnormalities of number of rotations distantly at a glance.

[0014]As furthermore shown in drawing 7 during a flight, when carrying out tilting operation of the right stick (29) to a right-and-left transverse direction, When carrying out the movement controls of the body to right and left (aileron operation) and carrying out tilting operation of the left stick (28) to an up-and-down lengthwise direction, When carrying out the movement controls of the body to order (elevator operation) and carrying out tilting operation of the left stick (28) to a right-and-left transverse direction further, When carrying out the movement controls of the nose to right and left (rudder operation) and also carrying out tilting operation of the right stick (29) to an up-and-down lengthwise direction, While controlling an engine output and changing gears a rise and lowering speed of the body (ene contest operation), when carrying out tilting operation of said sternway-before uniform velocity change-over switch (uniform switch) (49) ahead, When advancing the body automatically based on a GPS signal with the optimal constant speed (abbreviated 15 km/hr) for spraying and carrying out tilting operation of the change-over switch (uniform switch) (49) to back, Based on a GPS signal, the body is

automatically reversed with constant speed (abbreviated 15 km/hr), and the optimal flight for spraying operation is performed by the easy operation by the switch (49) of one.

[0015]As shown in drawing 8, when starting spraying operation above fixed flight height, After rotating a multistory disk first by considering the multistory disk rotary switch (47) of a spray machine as one, enable feeding of the drugs by one of a drugs feeding switch (48), the inconvenience by which ***** drugs are emitted at once on a multistory disk at the time of rotation of a multistory disk is made to cancel, and uniform spraying is performed. If it was in ****, the composition which feeds the drugs after multistory disk rotation on a circuit was shown, but. As shown in drawing 9, when the switch the single object for multistory disk rotation and for drugs feeding (64) is formed enabling free 3 position change and a multistory disk and drugs switch from OFF and one position to two positions at the time of one position, The composition which provides so that a multistory disk and drugs may be considered as one, when only a multistory disk switches from one and further 2 positions to three positions, and feeds the drugs after multistory disk rotation mechanically may be used.

[0016]As shown in drawing 10 and drawing 11, it is what made the oil tank (65) store separately the oil only for a two cycle used for engine fuel, and was considered as the lubricous oil supply composition of the oil separation method, Interpose a ball valve (68) into the oil pipe (67) which connects between the carbureters (66) of a gasoline engine (9) with an oil tank (65), and. Between carbureters (66) is connected with a ball valve (68) with a vacuum hose (69), A ball valve (68) is considered as full admission with the negative pressure of engine (9) idling rotation, It changes into the state where a throttle opening always supplies the oil whole quantity to each lubricating part (70) also at the time of smallness (a dive, OFF operation, etc.), and it constitutes so that it may prevent becoming lubricous oil deficiency by an engine (9) load change.

[0017]As shown in drawing 12 and drawing 13, it is what shows the composition which forms the hand truck-type infusion-of-drug device (71) to a drug tank (7), In the upper part of an injection tank (72), have an opening and closing valve (75) for exclusive use in a lower delivery (74) again, and drugs and a water inlet (73). It has provided in a run ring (76), grip handles (77) and a churning handle (78), and an air extraction mouth (79) and injection tanks (72), such as a guide arm (80). And the guide hook (81) which carries out the engagement hold of said guide arm (80) to a drug tank (7), Have an air extraction cap (82) and a **-like open operation object (84) which provides in an inlet (83) and pushes said opening and closing valve (75) open, and the drugs in a pouring device (71) on a tank (7) at the time of pouring. As shown in drawing 13, a pouring device (71) is moved to a tank (7) position by hand-pushed, When carry out engagement guidance of the guide arm (80) of a pouring device (71), cause a pouring device (71) in the guide hook (81) of a tank (7), making a delivery (74) face an inlet (83) and pushing an opening and closing valve (75) open by an operation body (84), It constitutes so that the drugs in an injection tank (72) may be poured into a tank (7). It is made to move to a tank (7) position by hand-pushed easily, without *(ing) and lifting an injection tank (72) in this composition, After guide arm (80) engagement pours drugs into a drug tank (7) at workability fitness at a guide hook (81) by easy operation which causes a pouring device (71).

[0018]

[Effect of the Invention]In the remote-control helicopter which uses this invention for the aerial application of drugs, etc. above so that clearly from an example, Since the body outside is made to equip with the engine rotation display (16) which displays an engine speed value, an engine speed value can be correctly checked also from the operation position which is distantly distant from a helicopter (A), and proper flight of a helicopter (A) and proper spraying of drugs can be enabled.

[0019]Form an engine rotation display (16) with a pilot lamp (16a), and. Since a pilot lamp (16a) is blinked at the time besides regulation of an engine speed value, the engine rotation situation of the helicopter (A) under flight can be correctly told to a manipulator at a glance.

[0020]Since the pattern of blink is changed by the above and the following from a specified speed, a manipulator can be made to distinguish certainly beyond regulation of the engine speed value of the helicopter (A) under flight, and the following.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is operation explanation of a helicopter.

[Drawing 2]It is a transverse-plane explanatory view of a helicopter.

[Drawing 3]It is a side explanatory view of a drug tank part.

[Drawing 4]It is a transmission-control circuit diagram.

[Drawing 5]It is a reception-control circuit diagram.

[Drawing 6]It is a display control flow.

[Drawing 7]They are operation flows of control.

[Drawing 8]They are spraying flows of control.

[Drawing 9]It is an explanatory view of the switch for multistory disk rotation and drugs feeding.

[Drawing 10]It is an explanatory view of the lubricating method of an oil separation type.

[Drawing 11]It is an oil supply characteristic figure.

[Drawing 12]It is an explanatory view of a drug tank and an infusion-of-drug device.

[Drawing 13]It is a pouring explanatory view of the infusion-of-drug device to a drug tank.

[Description of Notations]

(16) Display

(16a) Pilot lamp

[Translation done.]

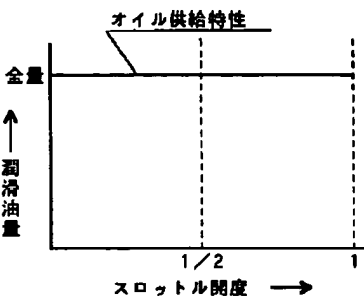
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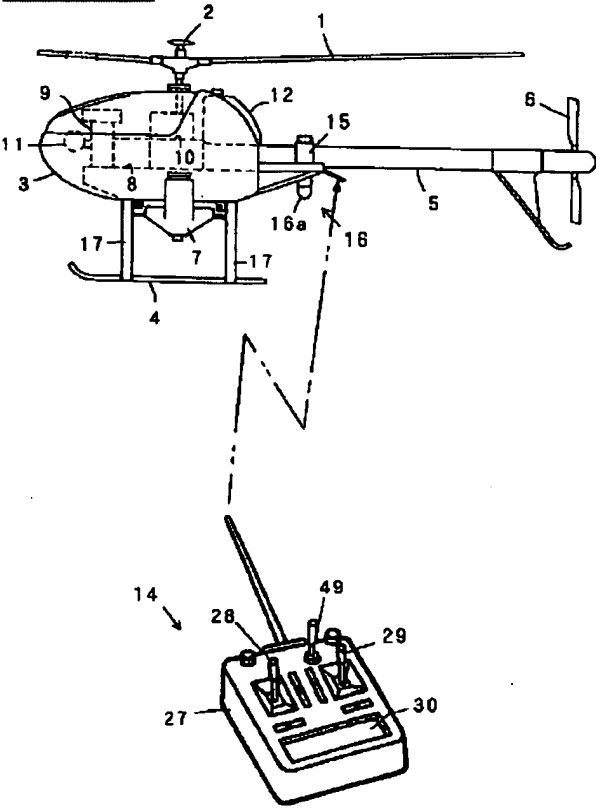
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DRAWINGS

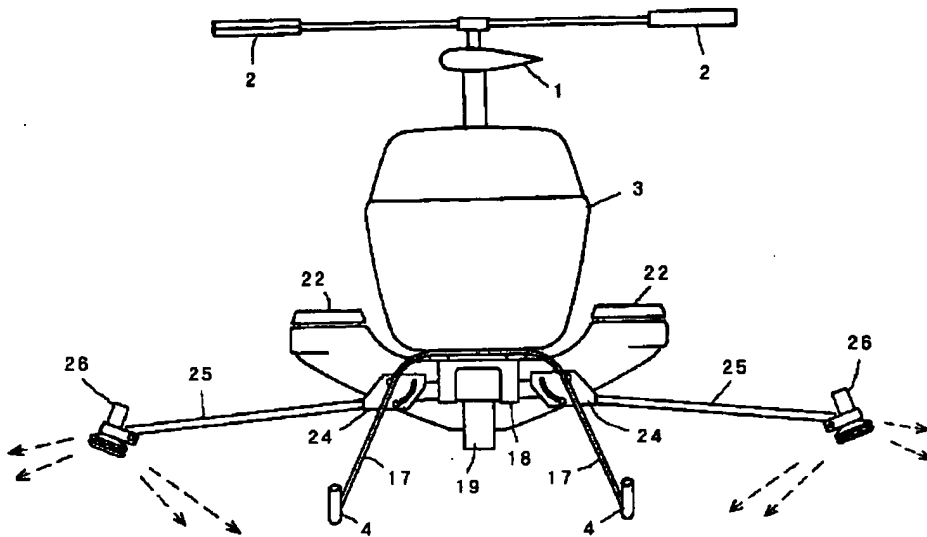
[Drawing 11]



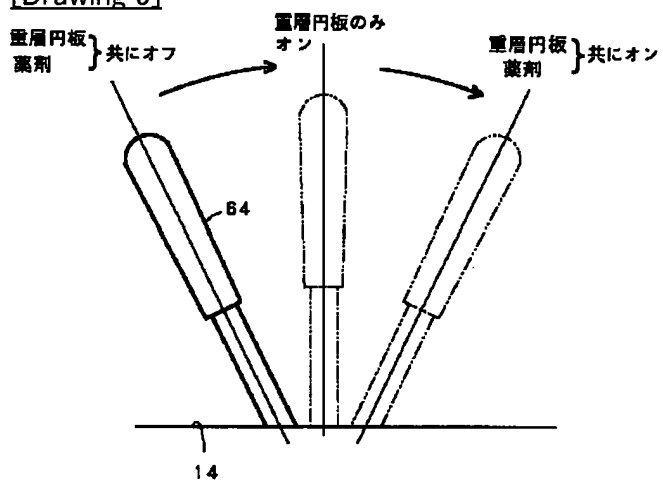
[Drawing 1]



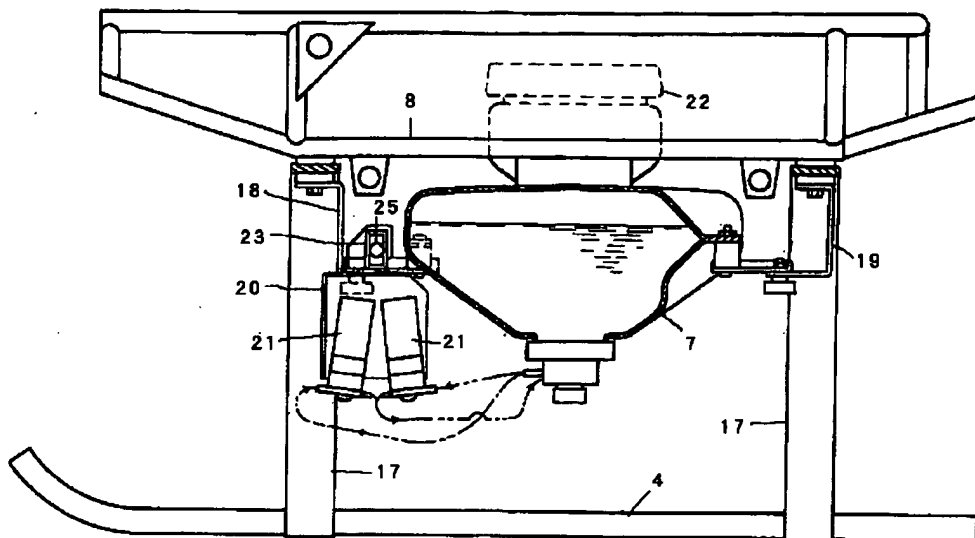
[Drawing 2]



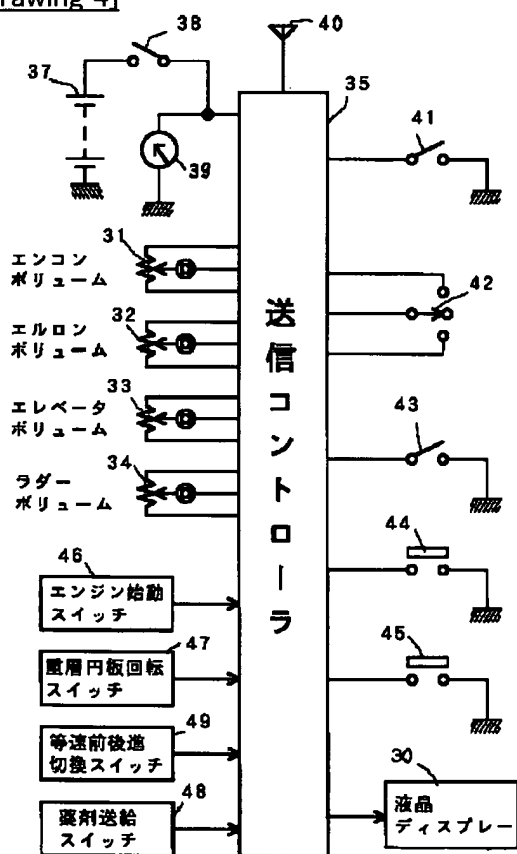
[Drawing 9]



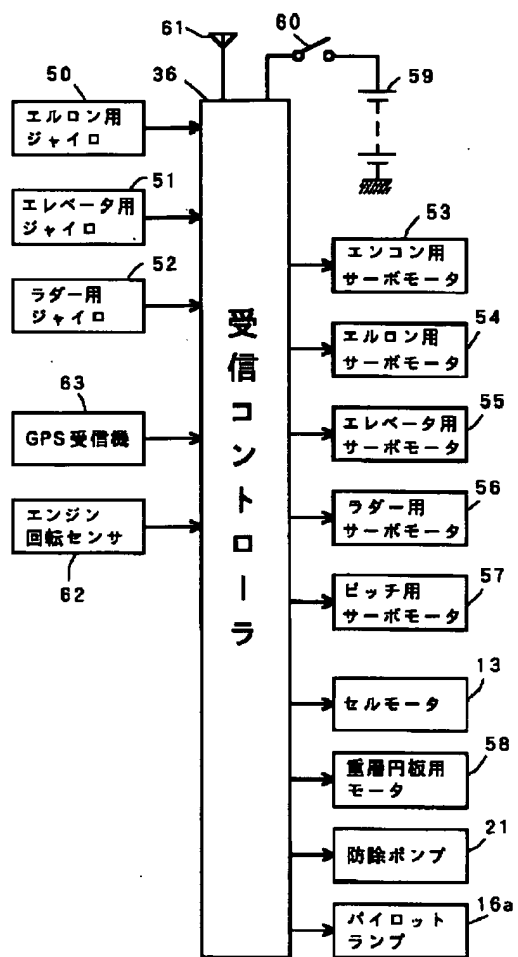
[Drawing 3]



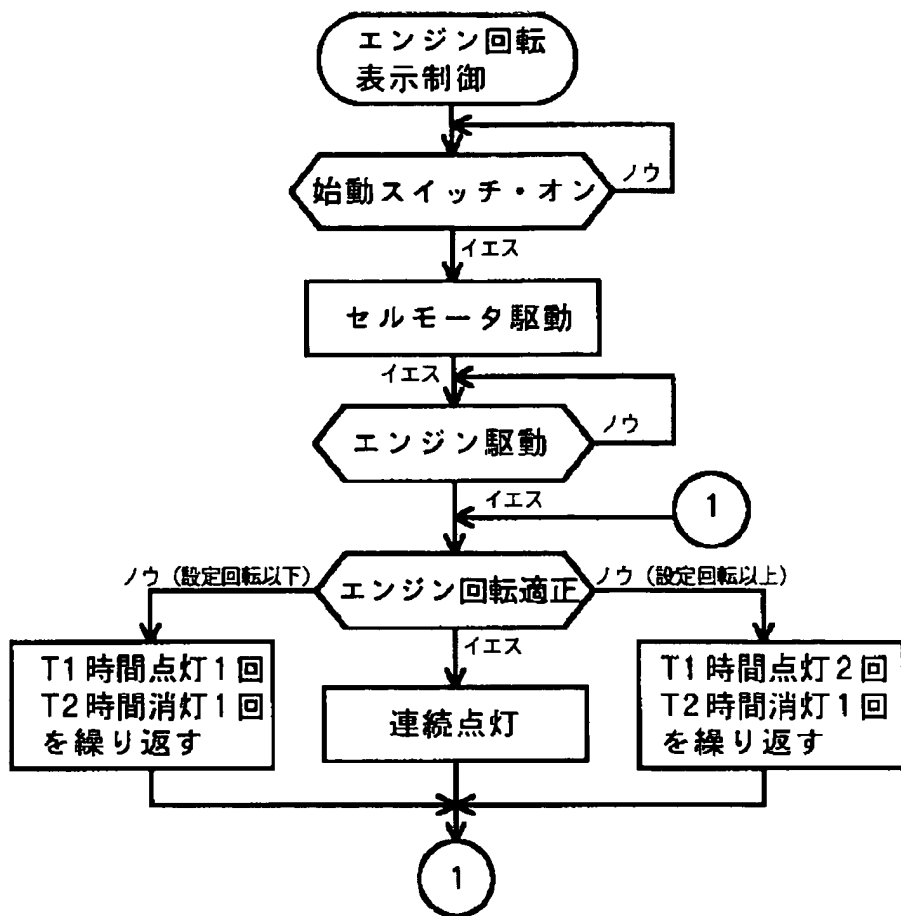
[Drawing 4]



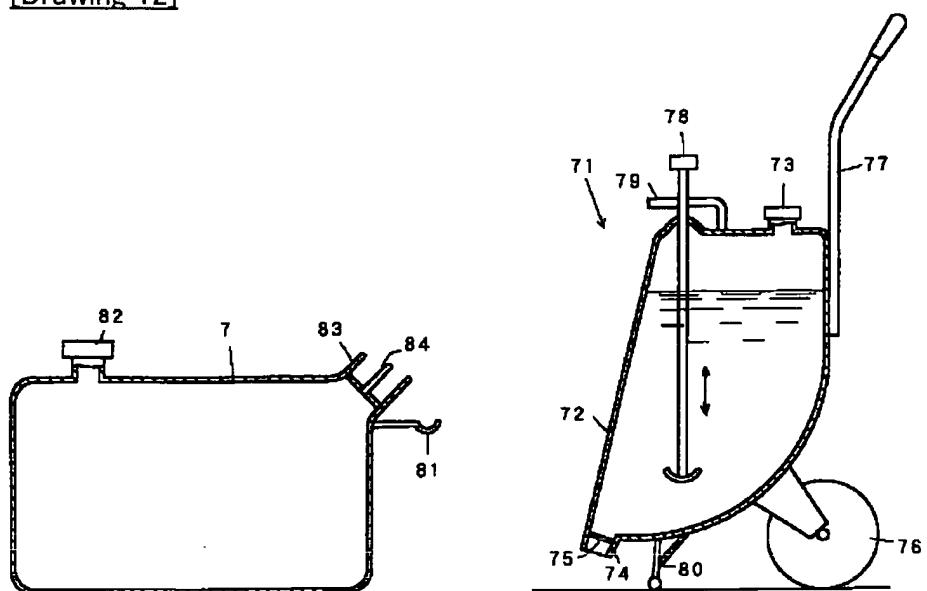
[Drawing 5]



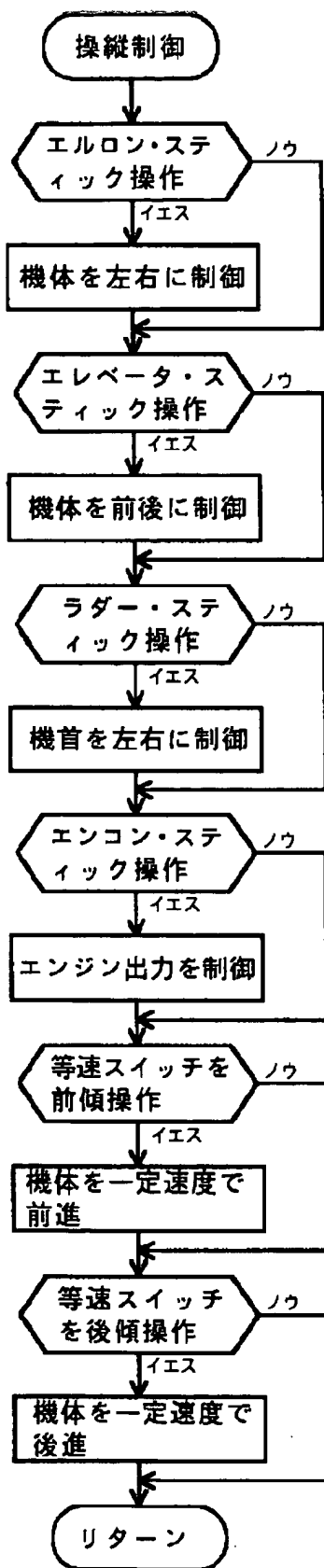
[Drawing 6]



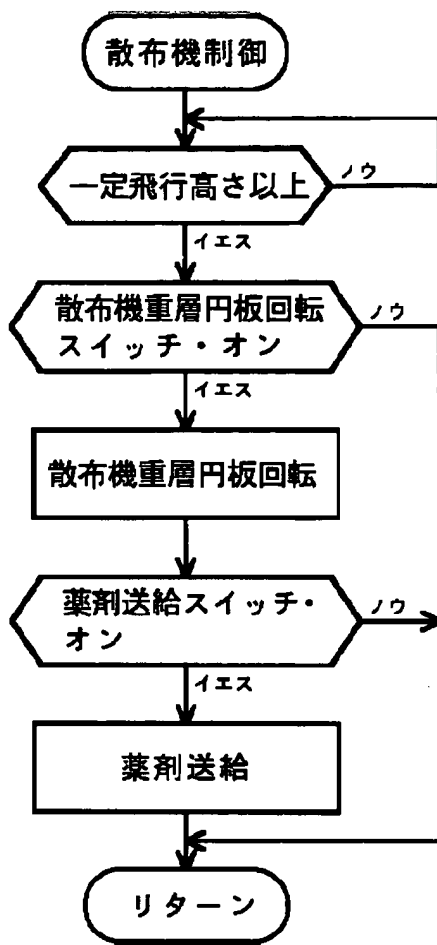
[Drawing 12]



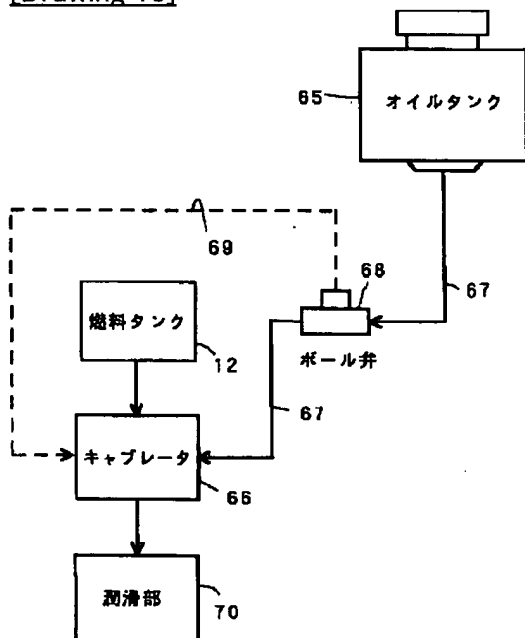
[Drawing 7]



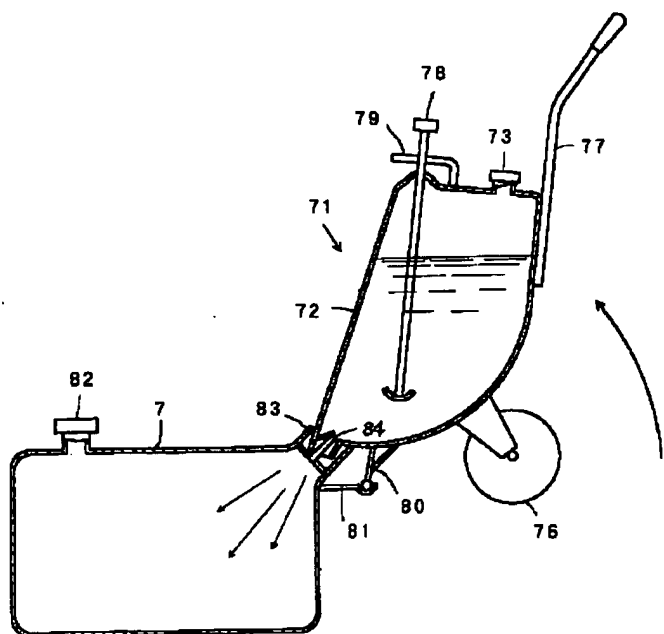
[Drawing 8]



[Drawing 10]



[Drawing 13]



[Translation done.]